

ECON 4340/8346

# **The Economics of Technology**

Spring 2008

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## **Seminar Description:**

The three credit-hour seminar meets on Tuesdays from 6-8:40 PM. The course will be conducted mainly as a seminar with ample student participation, including a research paper.

Schumpeter's process of creative destruction has often been identified as the economic theory that best explains the technological process of capitalist innovation that brings us new products. We will discuss how new innovations make life longer and better. We will examine how the process works. And we will examine the destructive side of creative destruction in the form of industries and jobs lost. The implications of creative destruction for research, teaching, and policy, will also be discussed, as will Christensen's elaboration of creative destruction, and its implication for business strategy.

Other topics in the economics of technology will also be discussed, including the roles, if any, of science and government in encouraging and directing new technologies.

Approximately the first 12 weeks of the seminar will focus on instructor-led discussion of important topics in the economics of technology. Readings for this section of the course will consist of chapters from the text, as well as important, usually recent, academic papers on the topics under discussion.

During the course, some time will be spent reviewing the characteristics of good writing style in economics and on effective research techniques

During the last two weeks, or so, of the seminar, instructor-led discussions will be significantly supplemented by student presentations on topics related to their papers and reviews.

## **Prerequisite:**

ECON 2200 or permission of the instructor.

**Main Required Texts:**

Christensen, Clayton M. and Michael E. Raynor. *The Innovator's Solution*. Harvard Business School Press, 2003. [ISBN # 1-57851-852-0] Assigned reading: Chs. 1-3.

Diamond, Arthur M., Jr. *Openness to Creative Destruction*. [pdf files of chapters will be made available through BlackBoard].

**Other Required or Supplemental Readings:**

Additional journal articles and chapters from monographs will be assigned on a weekly basis related to the topics that are to be discussed. Most of the readings below, will be included.

Adams, James D. "Fundamental Stocks of Knowledge and Productivity Growth." *Journal of Political Economy* 98, no. 4 (August 1990): 673-702.

Baumol, William J. "Textbook Entrepreneurship: Comment on Johansson." *Econ Journal Watch*. 3, no. 1 (Jan. 2006): 133-36.

Caballero, Ricardo. "Creative Destruction." In *The New Palgrave Dictionary of Economics*, edited by Steven N. Durlauf and Lawrence E. Blume. Basingstoke and New York: Palgrave Macmillan, 2008.

Cox, Michael W. and Richard Alm. "The Churn: The Paradox of Progress." *1992 Annual Report of the Federal Reserve Bank of Dallas*. (Downloadable online at: <http://www.dallasfed.org/fed/annual/index.html>).

DeLong, J. Bradford. "Cornucopia: The Pace of Economic Growth in the Twentieth Century." NBER Working Paper, w7602, March 2000.

DeLong, J. Bradford and Lawrence H. Summers. "The "New Economy": Background, Questions and Speculations." *Federal Reserve Bank of Kansas City Economic Review* (Fourth Quarter 2001): 29-59 (Originally presented at the Jackson Hole Conference of the Kansas City Federal Reserve Bank, August 2001.)

Diamond, Arthur M., Jr. "Fixing Ideas: How Research is Constrained by Mandated Formalism." *Journal of Economic Methodology* (forthcoming 2008).

- Diamond, Arthur M., Jr. "Zvi Griliches's Contributions to the Economics of Technology and Growth." *Economics of Innovation and New Technology* 13, no. 4 (June 2004): 365-397.
- Drucker, Peter F. "Modern Prophets: Schumpeter or Keynes?" Reprinted as Ch. 12 in *The Frontiers of Management*. New York: Penguin Putnam, Inc., 1999, pp. 104-115 (originally published as: "Schumpeter and Keynes." *Forbes* (May 23, 1983): 124-128).
- Feynman, Richard P. *What Do You Care What Other People Think?* Boston, Massachusetts: G.K. Hall & Co., 1990.
- Gordon, Robert J. "Does the 'New Economy' Measure Up to the Great Inventions of the Past?" *Journal of Economic Perspectives* 14, no. 4 (Fall 2000): 49-74.
- Greenspan, Alan. "Economic Flexibility." speech. Washington, D.C., Oct. 12, 2005.
- Katz, Michael L., and Howard A. Shelanski. "Schumpeterian Competition and Antitrust Policy in High-Tech Markets." *Competition* 14, no. 2 (Fall/Winter 2005): 47-60.
- Levy, Frank, and Richard Murnane. "Book Excerpt: The New Division of Labor." *Milken Institute Review* 6, no. 4 (2004): 61-82.
- McCloskey, Donald. "Economical Writing." *Economic Inquiry* 23 (April 1985): 187-222. (HB21.W43)
- McCraw, Thomas K. "Schumpeter Ascending." *American Scholar* 90 (Summer 1991): 371-92.
- Nelson, Richard R. "The Simple Economics of Basic Scientific Research." *Journal of Political Economy* 67, no. 3 (June 1959): 297-306.
- Rosenberg, Nathan. "Joseph Schumpeter: Radical Economist." In Shionoya, Yuichi and Mark Perlman, eds. *Schumpeter in the History of Ideas*. Ann Arbor: The University of Michigan Press, 1994, pp. 41-57.
- Schumpeter, Joseph. Ch. 7 on creative destruction, from: *Capitalism, Socialism and Democracy*. Harper-Collins, 1984.
- Squires, Arthur M. "The Vasa . . . the R100 . . . the R101." *The Tender Ship: Government Management of Technological Change*. Boston, Massachusetts: Birkhauser, 1986, pp. 1-10.
- Tufte, Edward R. *The Visual Display of Quantitative Information*. Cheshire, Conn.: Graphics Press, 1983, pp. 13-15, 53-54, 93-96, 107-110.

**ECON 4340 Course Requirements:**

Course grades will depend on the grades received on a midterm (100 points), a final exam (110 points), a medium-length critical review (100 points) of a book related to technology, and a seven minute presentation (20 points) based on the critical review. The midterm will consist of a combination of multiple choice questions and essay questions.

The review should be 8-10 pages of double-spaced, typewritten text (not including any footnotes and references). The review should summarize the substantive content of the book, stating the main themes or theses in each major section. The review should state the intended audience for the book, the clarity of the writing style, and the accuracy and usefulness of the information and analysis in the book. The student should do a thorough search for other published reviews of the book, and should summarize these reviews in her own critical review. A bibliography at the end of the review should include a full bibliographic citation to the book under review, as well as citations to any published reviews that are mentioned in the critical review. The correct form for the bibliography is provided later in this syllabus. Most of the guidelines in the syllabus section “Guidelines for Term Papers” also applies to the critical reviews. However, unlike the graduate term papers, the critical reviews do not need an abstract, do not require a literature search in Ingenta and other literature search databases, do not require a “thesis,” and would normally have few, if any, endnotes.

*The critical review should be submitted in paper form and also in digital form in Diamond’s digital drop box in BlackBoard. Please name the file with your last name. The review, with due attribution to you as the author, will be posted either to BlackBoard or to Diamond’s web site (or both) for future students to read and study.*

Undergraduates will be graded on a more favorable scale than graduate students (see scale below).

**ECON 8346 Course Requirements:**

Course grades will depend on the grades received on a midterm (100 points), a 12 minute class presentation (30 points), an extended research paper (130 points) on a thesis related to one of the topics covered on the reading list, and a final exam (70 points).

Each graduate student will research a paper/presentation, on some general question of the economics of technology.

***Papers/Presentations on a General Question of the Economics of Technology***

These papers would generally consist of collection, and effective organization, and analysis of evidence from the research literature on some useful or interesting issue of the economics of technology relevant to the course. The student will prepare a term paper of 13-15 pages of double-spaced, typewritten text (not including any footnotes and references). Students are encouraged to come up with topics that interest them, but are also encouraged to run the topics by the instructor for advice on the topic’s tractability.

Some sample possible topics are listed below:

1. What is the current evidence and argument about Schumpeter's claim that technological innovations come in long waves?
2. What is the current evidence and argument about the claim often attributed to Schumpeter that large firms are generally better able to successfully innovate than small firms? One question that continues to be debated arising from Schumpeter's work on Creative Destruction is whether large firms or small firms are more likely to come up with a successful leap-frog innovation. Schumpeter is usually thought to have believed that large firms have the advantage, although some have argued that this is a misreading of Schumpeter, or that he held different views early and late in his career. Of more interest than what Schumpeter thought, is the question of what is true. My impression here too is that there is mixed evidence on whether large or small firms have the advantage. You could summarize the theoretical considerations: large firms have access to capital; small firms have a culture more friendly to risk, for example. Then you could summarize some of the empirical evidence. The answer to this question would have policy implications: if small firms have an advantage over large firms, then maybe antitrust action by government is not necessary, and might be even harmful?
3. You could examine a little more deeply some of the sort of evidence that Forster and Kaplan present of creative destruction. You could look at the firms on the original Fortune 70 list that no longer exist. Classify the reasons why they went out of business. How many of them expired due to their being leap-frogged by a new technology, so they would really be examples of creative destruction? And how many expired for other reasons? (Incompetence of executives, merged with another firm and changed name, etc.)
4. Do similar to 3., except for firms exiting the S&P 500. To be manageable, you'd have to look at some limited period; maybe 1990-1995. You could look at how those that exited are doing now. How many regained S&P 500 status? How many continued to decline?
5. I think it would be of interest for someone sometime to see if Rogge's original table on leapfrogging in diuretics can be supported with better evidence. Can we figure out the actual names of the diuretics, and can those with greater market shares be shown to have actually been superior to those they leapfrogged?
6. What is the evidence, discussed by Brynjolfsson and others, for the growing importance of small firms in the U.S. economy? Is Milton Friedman correct that this evidence has been misinterpreted? (Probably this question would be easier for someone with some comfort level with econometric issues.)

7. What is Schumpeter's "central message" as measured by the references to Schumpeter in searchable books on Amazon.com?
8. Has Schumpeter's view of creative destruction and dynamic competition filtered down to the "core" of economics as reflected in the content of principles of economics, and higher level texts?
9. What have been the critical responses, extensions and applications of Christensen's extension of the Schumpeterian account of innovation?
10. Has the Schumpeterian account of creative destruction been the basis for defense arguments in antitrust cases; or discussed in legal rulings?
11. Should internet sales be exempt from sales taxes?
12. Should government take a greater role in picking the winners and losers in science and technology (as the supporters of "industrial policy" suggest)? (This topic might be more manageable if you focus on one or two particular cases: e.g., the government support of railroads, Japan's support for high definition TV, Al Gore's information superhighway.) [non-required reference: Tyson, Laura D'Andrea. *Who's Bashing Whom? Trade Conflict in High-Technology Industries*. Washington, D.C.: Institute for International Economics, Nov. 1992.]
13. Was the DARPA government agency a success in funding innovative new technology? If so, what were the reasons for the success (able people?, luck?, mission?)
14. Are there important technology "spin-offs" from government science projects such as NASA's Apollo program? Is this an effective way to advance technology, as opposed to investing directly in the area where technological advance is sought?
15. If government funding of science is cut, what does the economics literature say about the extent to which private funding would fill the gap? (reference the "crowding out" literature here).
16. What does the economics literature have to say on the importance of science in the development of technology?
17. How successful has the Japanese agency MITI been at implementing an industrial policy to focus resources toward promising technological advance?
18. Is innovation supply-driven or demand-driven?

19. Are the number of patents filed per year a good measure of the rate of technological progress?
20. Can there be increasing returns due to investment in technology?
21. Does international technology transfer hurt the country exporting the technology?
22. What role (if any) does marketing research play in identifying promising new technologies?  
It might be useful here to focus on a particular case study, e.g., Sony in its heyday, perhaps especially focusing on the Sony walkman. Rosenberg (EX, p. 5) suggests that what was most important was an “imaginative leap.”
23. Why has technological progress been so much greater in America than in other countries?
24. Why has technological progress been so much greater in the West than the East? Why, for instance, were there so many dead-end inventions in China?
25. What were the views of the Luddites? Did they make use of any economics (or refer to any economists) in their arguments? Do any contemporary economists defend them?
26. Have innovations in the development of the pencil been demand driven, supply driven, or both? (Read Petroski’s book as one primary source.)
27. Does the extent of protection of intellectual property rights in a country influence the country’s rate of technological progress?
28. Do technological innovations increase the proportion of smaller firms in the economy?  
(For the important, recent, case of information technology, see: Bynjolfsson, Eric, Thomas W. Malone, Vijay Gurbaxani, and Ajit Kambil. “Does Information Technology Lead to Smaller Firms?” *Management Science* 40, no. 12 (Dec. 1994): 1628-1644.)
29. It has been argued that Victorian England fell behind the U.S. in innovation and technological progress. Is this true? Were Victorian companies and entrepreneurs acting irrationally? (Read McCloskey here.)
30. Should cities and states provide greater incentives for high-tech firms to locate in their jurisdictions than low-tech firms?
31. Analyze the social costs and benefits of a major controversial technology such as the automobile, the computer, or nuclear power.
32. Have most technological advances had the ‘factor bias’ of being labor-saving? E.g., is the PC more a labor-saving or more a capital-saving advance?

33. Is incremental improvement or discontinuous advance, more characteristic of technological progress?
34. Have government electric car mandates proven successful in calling forth new technologies (as with sufficiently advanced new batteries) as Rosenberg (I, p. 176) suggests will be the case. In the electric car case, has the government in fact done what Rosenberg suggests-- e.g., has it guaranteed a high level of demand at a high price?
35. Are big firms or small firms more likely to innovate in process and product? What are the theoretical considerations and what does the evidence show? On the one hand, big firms would have more resources for diversifying against the risks of innovation. On the other hand, smaller firms are often viewed as more flexible, with less bureaucratic structure. (One reference favoring smaller firms would be Fairchild and Sosin 1986, p. 706)
36. What are the range of predictions that futurists make about future technology? What is the past track-record of technological predictions? Does a good knowledge of economics help you evaluate the prospects of technological prediction?
37. How important is the development of standards in promoting the advance and acceptance of new technology? If standards are important, are they most efficiently set by: a government agency, an industry consortium, or market competition between competing standards? One interesting topic would be simply to provide a descriptive catalog of important standards over a period of time, classifying them by how the standardization had been achieved.
38. Has the World Bank been successful in encouraging technological progress in developing countries? Rumor has it that there may have been a relevant article in *Business History Review* (Summer 1995). I also once heard a talk where they said that the World Bank was totally ineffective because of pressure exerted by donor nations leading to irrational decisions. If memory serves, the concrete example is that at any given time, a large percent of the World Bank installed pumps in Indian villages are broken. The reason is the large number of different brands of pumps in use for which parts are not readily available. Why the large variety of pumps used? ---the answer suggested was that each of the donor nations required that some of their country's pumps be used. (Lou Galambos has also been rumored to have written useful articles on the history of the World Bank.)
39. Create some project that tests some economic hypothesis using the newly created IBM FREE database of 2 million patents (from 1971) available on the WWW at: <http://www.ibm.com/patents/>
40. Summarize and evaluate the role of technological progress in the "new growth" models associated with Romer, Lucas and Barro. (Most of these models tend to be fairly

mathematical, so those with some comfort in mathematical economics might have a comparative advantage with this topic.)

41. Attempt to replicate Nordhaus's objective measure of the increases in productivity of lighting, using some other product or service. A list of potential products appears in his table 7 and includes, e.g., aeronautics, air conditioning, pesticides, insulin, automobile, radio, TV, radar, rockets, telephone, computer.
42. Analyze and evaluate alternative solutions to the Solow paradox: that we can see the computer age everywhere except in the productivity statistics.
43. Analyze and evaluate the economic justification (or lack of justification) for the Justice Department's antitrust actions against Microsoft.
44. Why were the "year 2000" forecasts of recession or any other significant problems for the economy, so much in error?
45. Follow up on Stigler's claim that ". . . if we go back to the *Principles* and to *Industry and Trade* to learn about technological progress or economic growth, our interest need not be exclusively historical, for here Marshall may supply new ideas and suggestions even if not theories." (p. 217 in: "Does Economics Have a Useful Past?" *History of Political Economy* 7, no. 2 (Fall 1969): 217-230.) What is Alfred Marshall's contribution to the economics of technology? Does he write anything that is of interest to us today?

In addition to the paper, near the end of the course each graduate student will give a 12 minute presentation on her topic, followed by about 3 minutes of questions from the class, and class discussion.

### **BlackBoard (aka MyUNO):**

Much information concerning the course will be posted to the web pages of BlackBoard which has a URL of: <https://myuno.unomaha.edu/>. For example, PowerPoint slides that accompany class lectures will generally be posted to BlackBoard. Test grades will also be posted there. Announcements pertaining to the class will either appear on BlackBoard or be sent out via Notes email through BlackBoard.

The following table provides the grading scale in terms of percentages, and total points in the course:

	Graduate Students		Undergraduate Students	
Grades	Percentages	Points	Percentages	Points
A+	95-100	313-330	93-100	306-330
A	90-94	297-312	88-92	290-305
A-	85-89	280-296	83-87	273-289
B+	82-84	270-279	80-82	264-272
B	78-81	257-269	76-79	250-263
B-	75-77	247-256	73-75	240-249
C+	72-74	237-246	70-72	231-239
C	68-71	224-236	66-69	217-230
C-	65-67	214-223	63-65	207-216
D+	62-64	204-213	60-62	198-206
D	58-61	191-203	56-59	184-197
D-	55-57	181-190	53-55	174-183
F	54 or less	180 or less	52 or less	173 or less

**Cheating:**

Exams will be attentively monitored. The result of academic dishonesty will be a grade of F for the seminar.

**Plagiarism:**

Copying the work of others without attribution is a form of intellectual theft known as plagiarism, and is a major offense among scholars (and other civilized people).

Most clearly, any material that is directly quoted, should appear within quotation marks, if a sentence or less, or indicated with a 'block indent' if more than a sentence (which means that the whole quote is indented 5 spaces from the left edge of the text). **Failure to use either quotation marks, or block indent, with direct quotations will result in zero points for the assignment.**

When a source is used in the text, internal references should be given in the text that consist of a parenthetical mention of the author's last name, the date of the publication and a

specific page number (if appropriate). For each brief parenthetical reference, a complete bibliographic reference should be provided in the Bibliography.

**“Honors Contract” for Undergraduate Honors Students:**

Undergraduate students enrolled in the Honors Program, may receive honors credit for the course by completing an honors contract and fulfilling the terms of the contract. The contract will specify conditions identical to the graduate requirements for the course (viz., a presentation and a longer term paper).

**Partial, Tentative Outline of Readings Assignments:**

Some of the special value of a special topics seminar is that we can be especially responsive to the special and evolving interests of the students and professor; and can include the latest breaking research on the topics studied. As a result, the following schedule is very tentative and may be modified and expanded as the semester progresses.

1. 1/15/08 Description of course; general background on the economics of technology; review of the standard account of competition.
2. 1/22/08 Research tools in economics of technology; how to write clearly; how to present clearly.

McCloskey, Donald. "Economical Writing." *Economic Inquiry* 23 (April 1985): 187-222.

Tufte on clear graphing

3. 1/29/08 Preface and Ch. 1 “Introduction”

Schumpeter, on creative destruction

McCraw. “Schumpeter Ascending.”

Cabellero. entry in Palgrave on Creative Destruction

Rosenberg, Nathan. "Joseph Schumpeter: Radical Economist."

4. 2/5/08 Ch. 2 "The Benefits of Creative Destruction Are Large, and Can be Larger"

DeLong, "Cornucopia."

Gordon. "Does the New Economy Measure Up to the Great Inventions of the Past?"

5. 2/12/08 Ch. 3 "The Costs of Creative Destruction Are Not as Large as We Think, and Can be Reduced"

Cox and Alm, on churn

Levy and Murnane, on creation of better jobs.

Greenspan, on economic flexibility

6. 2/19/08 Ch. 4 "Reception of Creative Destruction Among Scholars and Book Authors"

Drucker, Peter. "Modern Prophets: Schumpeter or Keynes?"

**(Tentative term paper topics due.)**

7. 2/26/08 Ch. 5 "Implications of Creative Destruction for Research and for What Economists Teach"

Griliches intro & last chapter; or my summary in my Griliches paper.

Baumol, William. "Textbook Entrepreneurship."

8. 3/4/08 Ch. 6 “Implications of Creative Destruction for Policy”  
DeLong and Summers, on policies to encourage creative destruction.  
Katz and Shelanski, on implications of creative destruction for antitrust policies.
9. 3/11/08 **Midterm exam.** (Exam will cover assignments through 3/4/08.).
10. 3/18/06 **Spring Break (no class).**
11. 3/25/08 Chs. 7 & 8 “Conclusion; and Afterword on Why Creative Destruction Has Been Neglected”  
Diamond, on fixing ideas.  
**(for graduate students: initial bibliography due, in format that will be used in the term paper.)**
12. 4/1/08 Christensen & Raynor. *The Innovator’s Solution*, Chapters 1-3.
13. 4/8/08 Class cancelled due to Diamond presenting papers at the meetings of the Association of Private Enterprise Education.
14. 4/15/08 Does science promote technological innovation?  
Diamond. “Economics of Science.” Palgrave

Nelson, Richard R. "The Simple Economics of Basic Scientific Research." *Journal of Political Economy* 67, no. 3 (June 1959): 297-306.

Adams, James D. "Fundamental Stocks of Knowledge and Productivity Growth." *Journal of Political Economy* 98, no. 4 (August 1990): 673-702.

15. 4/22/08 Has the government been successful in supporting new technologies?

Squires, Arthur M. "The Vasa . . . the R100 . . . the R101." *The Tender Ship: Government Management of Technological Change*. Boston, Massachusetts: Birkhauser, 1986, pp. 1-10.

Feynman, Richard P. *What Do You Care What Other People Think?* Boston, Massachusetts: G.K. Hall & Co., 1990.

16. 4/29/08 *Student Presentations/Discussions*; summing up. **Papers due.**

17. 5/6/08 **Final Exam.** (Exam is comprehensive and may cover anything covered in course.)

### Presentations

Presentations should make use of PowerPoint slides. PowerPoint will not be taught during the class, but the instructor can guide the student toward resources, that will help the student to learn the basics of PowerPoint.

### Guidelines for Term Papers

Late papers will be accepted, but will have 5% of the possible paper points deducted initially and an additional 1% deducted for each day the paper is late beyond the first day (so, e.g., if a paper is five days late, 9% of the possible paper points will be deducted). Late papers may result in a grade of I (incomplete) for the course on the initial grade report.

The paper should be written at a consistent level of difficulty. In most cases, the paper should be written to be understandable by a conscientious undergraduate economics major. That means you should assume that you are writing for someone who is intelligent, interested, short on

time, and does not have a deep knowledge of science or the higher level technical details of economics.

The paper should have a title page including the title, your name, the name of the course, the course number and the date on which the paper is turned in. Following the title page, on a separate page should be a 100 word abstract. Neither the title page nor the abstract page counts toward the page limit of the paper. Pages in the body of the text (beginning with the Introduction) should be consecutively numbered. The whole paper should be double-spaced and should have inch and a half margins on the top, bottom, right and left. The font size should either be 10 point or 12 point in size. Any quotations longer than one sentence should be presented in “block indent” form (meaning that the whole quote is indented 5 spaces from the left edge of the text). Please do not put your paper in a special binder that would limit the space for my comments. Instead, staple or clip it together.

Use endnotes rather than footnotes. (But endnotes should be used only if really necessary.)

When a source is used in the text, internal references should be given in the text that consist of a parenthetical mention of the author's last name, the date of the publication and a specific page number (if appropriate). For each brief parenthetical reference, a complete bibliographic reference should be provided in the Bibliography (that is not counted in the page limit). The ultimate arbiter for reference format is style “A” described in the latest edition of *The Chicago Manual of Style*.

Before you turn in your final draft, be sure to submit it to a spell-checking program (available with all major word-processing programs).

As you work on the text of your paper, be sure to periodically backup your latest draft onto a floppy disk, or other medium. Also be sure to keep a clean copy of your paper for your files---the copy you turn in to me will be marked-up in red ink.

In your introduction, you should describe your problem and your thesis. This might be a good place to mention the contents of any broadly relevant articles that you turned up in your Ingenta, EconLit and other literature searches. If there is no relevant material on Ingenta or EconLit for your topic, mention the absence of relevant material (and include in the appendix, a list of the keywords that you used to search under and the articles that resulted). (That is, it would be very unusual to have no relevant articles appear, so if you claim that there are none, the burden of proof is on you.) Briefly (in a few sentences) summarize what you will be doing in the rest of the paper.

#### SOME SPECIFIC REQUIREMENTS:

- a. The paper should have inch and a half margins on the left hand side, the right hand side, the top and the bottom. (Ample margins make it easier for me to jot down comments.)
- b. The style for references should follow the sample form provided on p. 12 of this syllabus. It should be consistent and should provide enough information for the reader to track down a reference, if necessary. Perhaps the most widely used style format in economics is that found in: *The Chicago Manual of Style*, latest edition,

The University of Chicago Press.) Of the two “basic” styles the *Manual* discusses, the one used in economics is a variant of what is called style “A.”

- c. Attempt to write as McCloskey suggests in "Economical Writing".
- d. Do not place your paper in a plastic cover or other binder.
- e. Make a photocopy of your paper before turning it in.
- f. The paper is due at the beginning of class on the last day of classes.

*The term paper should be submitted in paper form and also in digital form in Diamond's digital drop box in BlackBoard. Please name the file with your last name. The paper, with due attribution to you as the author, may be posted either to BlackBoard or to Diamond's web site (or both) for future students to read and study.*

### **Sample Form for Bibliographic References**

The following sample bibliography is intended to illustrate the mandated reference format for several different kinds of publications. The last entry is for a web resource, and gives an example where a lot of information is available---you may not always be able to provide quite as much detail, but should provide what you can. (The Jones entry is fictitious, and is adapted from: <http://www.lib.ohio-state.edu/guides/chicagogd.html>)

Ackermann, Robert John. *Data, Instruments and Theory*. Princeton, N.J.: Princeton University Press, 1985.

Acs, Zoltan J., David B. Audretsch and Maryann P. Feldman. "Real Effects of Academic Research: Comment." *The American Economic Review* 82, no. 1 (March 1992): 363-367.

Adams, James D. "Fundamental Stocks of Knowledge and Productivity Growth." *Journal of Political Economy* 98, no. 4 (August 1990): 673-702.

Alchian, Armen A. "Private Property and the Relative Cost of Tenure." In *Economic Forces at Work*. Indianapolis: Liberty Press, 1977 (essay originally published in 1958).

American Chemical Society. *Directory of Graduate Research 1989*. Washington, D.C.: American Chemical Society, 1989.

Becker, William E., Jr. "Maintaining Faculty Vitality through Collective Bargaining." In Shirley M. Clark and Darrell R. Lewis, eds. *Faculty Vitality and Institutional Productivity: Critical Perspectives for Higher Education*. New York: Columbia University, Teachers College Press, 1985, pp. 198-223.

Davis, Elizabeth. "Compensation Gains of Faculty Unions and the Unemployment Effect of Extending Unemployment Insurance Coverage." (PhD Dissertation, University of Michigan, 1988).

Diamond, Arthur M., Jr. "Age and the Acceptance of Cliometrics." *The Journal of Economic History* 40, no. 4 (December 1980): 838-841.

"The Career Consequences of Accepting a Scientific Mistake." working paper, 1992.

Friedman, Milton. "An Open Letter for Grants." *Newsweek* (May 18, 1981): 99.

Garfield, Eugene, (chairman). *Science Citation Index*. Philadelphia: Institute for Scientific Information, Inc., 1961-present.

Jones, Sarah Jean. "The Country of Last Resort." [online]. New York: Columbia University, Academic Information Systems, Bartleby Library, posted Jan. 2, 1996 [cited October 12, 1998]. Available from World Wide Web: (<http://www.columbia.edu/acis/.bartleby/jones>)

Lucas, Robert E., Jr. "Incentives for Ideas." *New York Times* (April 13, 1981): 23.

Moore, Rich. "Compaq Computer: COMPAQ Joins the Fortune 500 Faster Than Any Company in History." In Businesswire [database online]. San Francisco: Business Wire. 1986-[updated 9 April 1986: cited 10 March 1990]. Accession no. 000782: NO=BW420. 5 screens. Available from DIALOG Information Services, Inc., Palo Alto, Calif.

**Important Dates:**

March 11: midterm exam (tentative date).

March 18: class cancelled for spring break.

April 4: Last day to drop course with a grade of "W".

April 8: class cancelled so Diamond can present papers to APEE meetings.

May 6: Final exam 6:00 - 8:40 PM.